Remarks

Claims 1-29 were pending in the subject application. By this Amendment, Applicants have amended claims 1, 3-9, 11-13, 15, 27, and 28, canceled claim 2, and added new claims 30-41. Support for these amendments and new claims can be found throughout the subject specification. Entry and consideration of the amendments and new claims presented herein is respectfully requested. Accordingly, claims 1 and 3-41 are currently before the Examiner. Favorable consideration of the pending claims is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

Respectfully submitted,

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DRP/sl
Attachment: Marked-Up Version of Amended Claims

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PATENT & TRADEMARK OFFICE

Docket No. UF-178AXC2
Serial No. 10/079,478

Marked-Up Version of Amended Claims

Claim 1 (amended):

1. A polynucleotide encoding a mutant [starch biosynthesis protein] subunit of a plant ADP-glucose pyrophosphorylase polypeptide, or a biologically-active fragment [or variant] of said mutant [protein] polypeptide, wherein said mutant [protein] polypeptide comprises an amino acid mutation in the amino acid sequence of said polypeptide and wherein when said mutant polypeptide is expressed to form a mutant ADP-glucose pyrophosphorylase enzyme, said mutant enzyme, or a biologically-active fragment of said mutant enzyme, exhibits increased heat stability relative to the wild type [protein] ADP-glucose pyrophosphorylase enzyme.

Claim 3 (amended):

3. The polynucleotide according to claim [2] 1, wherein said mutant [protein] polypeptide encoded by said polynucleotide comprises an amino acid mutation in the large subunit of said [protein] mutant enzyme.

Claim 4 (amended):

4. The polynucleotide according to claim [2] 1, wherein said mutant [protein] polypeptide encoded by said polynucleotide comprises an amino acid mutation in the small subunit of said [protein] mutant enzyme.

Claim 5 (amended):

5. The polynucleotide according to claim 3, wherein said mutant [protein] polypeptide encoded by said polynucleotide comprises an amino acid mutation wherein [a histidine residue at] the amino acid corresponding to position 333 in the amino acid sequence of [said protein] the wild type large subunit of ADP-glucose pyrophosphorylase polypeptide of maize is replaced by an amino acid that confers said increased heat stability [to said protein] on said mutant enzyme.

Claim 6 (amended):

6. The polynucleotide according to claim 5, wherein said amino acid substituted for [histidine at] the amino acid corresponding to position [number] 333 is a glycine.

Claim 7 (amended):

7. The polynucleotide according to claim 5, wherein said amino acid substituted for [histidine at] the amino acid corresponding to position [number] 333 is a phenylalanine.

Claim 8 (amended):

8. The polynucleotide according to claim 5, wherein said amino acid substituted for [histidine at] the amino acid corresponding to position [number] 333 is a methionine.

Claim 9 (amended):

9. The polynucleotide according to claim 1, wherein said mutant [protein] polypeptide encoded by said polynucleotide further comprises an amino acid mutation that confers increased seed weight to a plant expressing said polynucleotide.

Claim 11 (amended):

11. The polynucleotide according to claim 9, wherein said polynucleotide encodes a [maize] large subunit AGP enzyme wherein at least one serine residue is inserted between amino acids corresponding to positions 494 and 495 in the amino acid sequence of wild type large subunit of ADP-glucose pyrophosphorylase polypeptide of maize of the native AGP enzyme subunit.

Claim 12 (amended):

12. The polynucleotide according to claim 9, wherein said polynucleotide encodes a [maize] large subunit AGP enzyme wherein the amino acid pair tyrosine:serine is inserted between amino acids corresponding to positions 494 and 495 in the amino acid sequence of wild type large subunit of ADP-glucose pyrophosphorylase polypeptide of maize of the native AGP enzyme subunit.

Claim 13 (amended):

13. The polynucleotide according to claim 9, wherein said polynucleotide encodes a [maize] large subunit AGP enzyme wherein the amino acid pair serine:tyrosine is inserted between amino acids corresponding to positions 495 and 496 in the amino acid sequence of wild type large subunit of ADP-glucose pyrophosphorylase polypeptide of maize of the native AGP enzyme subunit.

Claim 15 (amended):

15. The method according to claim [11] 14, wherein said plant is a monocotyledonous plant.

Claim 27 (amended):

27. A mutant [starch biosynthesis] subunit of a plant ADP-glucose pyrophosphorylase polypeptide, or a biologically-active fragment of said mutant polypeptide, [protein] encoded by the polynucleotide of claim 1.

Claim 28 (amended):

28. A method for identifying a polynucleotide encoding a mutant [starch biosynthesis] subunit of a plant ADP-glucose pyrophosphorylase polypeptide [protein] wherein said mutant [starch biosynthesis protein] polypeptide comprises an amino acid mutation in the amino acid sequence of said polypeptide and wherein when said mutant polypeptide is expressed to form a mutant ADP-glucose pyrophosphorylase enzyme, said mutant enzyme, or a biologically-active fragment of said mutant enzyme, exhibits increased heat stability relative to a wild type [protein] ADP-glucose pyrophosphorylase enzyme, said method comprising mutating a polynucleotide encoding a starch biosynthesis protein, expressing said mutated polynucleotide in a cell to produce a mutant starch biosynthesis protein, and determining whether said mutant starch biosynthesis protein exhibits increased heat stability relative to the wild type starch biosynthesis protein.